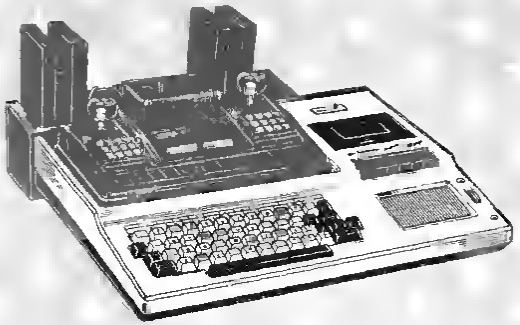

OCTOBER '84

I-M 1 IN A MILLION CLUB

NATIONAL NEWSLETTER

INSIDE...

PICTURES & MOTION IN REVIEW
ARCADE REVIEW
OLDE TUNE FROM HAL BLOOM
CLUB OUTLOOK...EXTRA
KAMEL by GLENN JONES
1985 ENROLLMENT FORM
MEMBER SURVEY

GEO*GRAFIX LIMITED
P O Box 54 • Arrowsmith Illinois 61722

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___JUMBLED UP THINGS

Please list 'A' for ALL ALTERNATES
___PAK MAN ___SUPERFROG ___ESCAPE
___MS. PAK ___FOOSEBALL

GENERAL NEWS

FROM KEITH JOHNSON

Keith has sent in copies of APF's advertisement flyers to be added to the growing APF memorabilia collection. The flyers give some detail, pictures, and advertising hype. If you would like copies, send a S.A.S.E.

THANK YOU KEITH!

LATEST PROGRAM/REVISION from BILL BOWMAN

A FRONT SCREEN PROGRAM that was submitted for the program library in the past has been revised and is now available to the membership.

This program contains instructions regarding the operation, and is very easy to use. It's purpose is to allow the user to make LO RES front screens for any program.

THANKS AGAIN BILL!

FROM KEITH PHILLIPS

Keith has been working on an ingenious way to make the IM-1 SPEAK by using ML loops and timing, and manipulating the internal oscillator of the computer. By changing intervals in the ML routine, a multitude of sound effects can be produced. With some IMAGINATION, these effects can be interpreted as actual spoken WORDS!

A copy of Keith's program can be obtained from the library as tape #SE-1. Take note that this program is merely an experiment to produce speech, but for sound effects, its very good. More on this subject when. available from Keith.

THANK YOU KEITH!

BYTE ARTICLE DIDN'T MAKE IT IN SEPTEMBER

I must apologize to those of you who may have vigorously attacked the magazine stores, in droves, clawed, scratched, kicked, and fought for the last BYTE on the shelf, only to find the article (as mentioned in last month's newsletter) MISSING!

Perhaps in OCTOBER? PERHAPS!

FLASH...THE ARCADE IS MISSING!

Somewhere between Arrowsmith, Illinois and Greenfield, Wisconsin lies this month's ARCADE section. Because of this we will print some enlarged OP CODE sheets and some general information about the 6800 for review. We hope to have the regular instruction next month.

FI-100's and SI-232's SOUGHT!

Lately several requests have come in for the FI-100 and SI-232 interfaces.

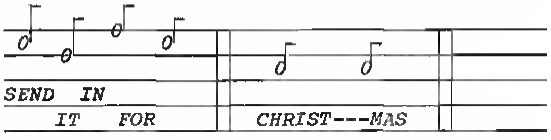
If you have any that you would like to sell, please contact us in writing and enclose your asking price. We'll post it on the bulletin board and pass the information along to those who are interested. Thank you.

WHO IS INTO EXTERNAL CONTROL?

Along with hardware requests, we have received a few inquiries regarding external control using the IM-1.

Before becoming involved with the newsletter, I was working on a design for an interface that would allow the IM-1 to control up to 256 remote devices using signals super-imposed on household current. This method is commonly used in computer control of external devices and is the basic operating principle behind the BSR X-10 controller.

There are many manufactured units available today that are STAND ALONE, RS-232 driven, and come with appropriate software. However these units tend to be quite expensive. Therefore, I decided to begin work on developing an interface from the internal PIA of the IM-1, to the BSR unit. I haven't had time to get back to it. I would like to know if anyone in the club has ventured into this area and has possibly completed an interface of this type. It would also be interesting to know if anyone has accomplished DIRECT RELAY CONTROL using the PIA or SI-232 port. If so, would you be so kind as to share this knowledge with other members through the newsletter?



CHRISTMAS MUSIC, FRONT SCREENS, anything to "Make the season bright !"

If you have ever wanted to see your work printed, NOW IS THE TIME! The Christmas issue could be our last (see LETTER), so don't delay in sending in your Christmas favorites. We are hoping for a LARGE colorful issue in DECEMBER.

PRODUCT REVIEW

PICTURES & MOTION(tm) by ALFRED FRESSOLA

There have been some very good programs and instruction in the past that have given IM-1 owners the ability to create and store HI RESOLUTION shapes, and past newsletters have dealt with color sets, modes, object definition, etc. These programs and instructions have expanded our knowledge and capabilities pertaining to the creation of colorful, interesting HI RES screens.

Alfred Fressola has taken this know-how several steps beyond! His new program, PICTURES & MOTION (tm) is a culmination of HI RES creation and display technique, combined with fascinating shape and screen movement.

Shape building is easy with this program. Divided-screen PROMPTS appear in LO RES and ask you for pertinent color definition; *after which* a LARGE shape block appears dimensioned according to the mode selected. *Co-ordinances* appear on the left side of the block so that you can easily create, re-create, or modify your shapes. Cursor controls are provided which allow you to color in your shape with the colors that are available.

Once a shape is made, you may elect to save it, change it, or display it on the HI RES screen. You can then go onto making other shapes (31 possible).

The program allows you to butt 2 shapes together in the LO RES shape making mode. This nice feature lets you look at one shape in relationship to another, thus allowing shape symmetry to be maintained.

Once the shapes are completed, they can be displayed with others on the HI RES screen. The same cursor controls that were used in the creation of the individual shapes can then be used to maneuver them on the screen.

After the picture is pieced together, a number of MOVEMENT commands can be called upon. You may elect to have 1 particular shape to move left to right across the screen; the speed of which can be controlled by depressing various alpha keys on the main keyboard (ASCII value determines the speed). A different movement feature permits the user to see a particular shape move around the screen randomly with it's speed controlled as explained. Finally, the ENTIRE screen can be moved left, right, up, or down by depressing 4 direction keys on the keyboard. This function makes your squadron of F-15's come alive! Speed controls also apply in this mode.

The picture may be displayed in either hi res mode (1 or 2) and in either color set, all while the picture is being displayed. Thus, FOUR variations of the created picture can be easily viewed. The background shape which is initially entered for all screen locations can, like the other created shapes in the high resolution picture, be modified by recalling the shape from the high resolution screen.

It would be impossible to cover ALL the features of this program in this space. We have covered the main highlights and have tried to convey the remarkable versatility and quality of this program. If you are into HI RES screen making and are looking for a program that lets you create with ease, store your pictures to tape, and display them with movement, PICTURES & MOTION (tm) does it ALL!

CLASSIFIED

EXTRA

The following information is provided to let you know how we stand as a club, what changes are needed to continue, and to fill you in on what we have attempted to do this year to increase the membership. We'd also like to share some thoughts regarding club member activity in the coming year. We invite your comments on the enclosed enrollment-survey form.

We're a very small group. With very few members in 1984 opposed to 833 the previous year, our survival is based upon several very essential needs...ACTIVITY, INCREASED ENROLLMENT, UNIFIED EFFORT, AND KNOWLEDGE. Where one essential is missing or lacking, the others suffer as a result. Let's take a look at each one in perspective.

INCREASED ENROLLMENT...Over the past year we have periodically mailed sample issues and flyers to ALL KNOWN OWNERS of APF computers. According to facts published in various magazines in the past, APF ELECTRONICS manufactured about 5000 IM-1 computers. Out of this number, we have contacted approximately 1400 owners (NON MEMBERS) with an invitation to join the club. As of this writing, 29 owners have responded. This amount is not sufficient enough to cover the printing and mailing costs of the sample issues and flyers, let alone servicing their membership for an entire year. Compounding the situation is the recent 40% increase in printing costs and rumors of a postal rate hike in the wind. After adding the costs of equipment and supplies to produce the newsletter with any type of quality at all, the total costs over the year surpass the initial income.

ACTIVITY, UNIFIED EFFORT, KNOWLEDGE...If you look back at each issue of the newsletter you will quickly discover WHO has been active in the club this past year. The number of active members, as a percentage, compared to the number of inactive members would be very reasonable IF the club was LARGE. However, in our case, the MAJORITY of the membership SHOULD BE ACTIVE in order to bring about needed instruction, ideas, programs, products, and services. Although the 1984 newsletter contained many of these things, MUCH MORE is needed to continue on. The MAJORITY MUST contribute to the success of the club. Other clubs have failed because this standard was not maintained.

Newcomers to the club who need instruction (as we all have, and still do) would be greatly encouraged by seeing an active membership. In time, THEIR knowledge can be re-channeled back into the club to benefit others.

There is one final point to mention while on this subject. The newsletter is strictly a MEMBER GENERATED publication, unlike any computer magazine that exists today. YOU are it's writers. YOU decide what goes into it, and YOU are its only readers. Please seriously consider the opportunity you have as a club member to freely use this medium.

WHAT CAN BE DONE? A POSITIVE APPROACH!

If each of us would consider the CLUB, THE NEWSLETTER, and THE COMPUTER to be WORTHWHILE, and would be willing to take a few minutes now and then to write in with new programming ideas, helpful hints, maintenance tips, modifications, etc., or even just to say HELLO, we'd begin the new year with a postive outlook and a much healthier club!

NEXT YEAR?

It all depends upon what YOU do the remaining portion of this year, and if the membership stays near its present level for next year.

Enclosed you will find an enrollment form with a questionaire. We request that all questionaires be returned with your 1985 membership dues BEFORE NOVEMBER 30, 1984. We need to know what areas you may be able to help in. Also, we would like to know your level of familiarity with the IM-1 so that we can gear a portion of the newsletter to your needs. Remember, the club will not be changing hands this year. It is strictly up to YOU if we will resume operation in 1985. Thank you for taking the time to read this letter and we hope, for the sake of the club, that you will respond.

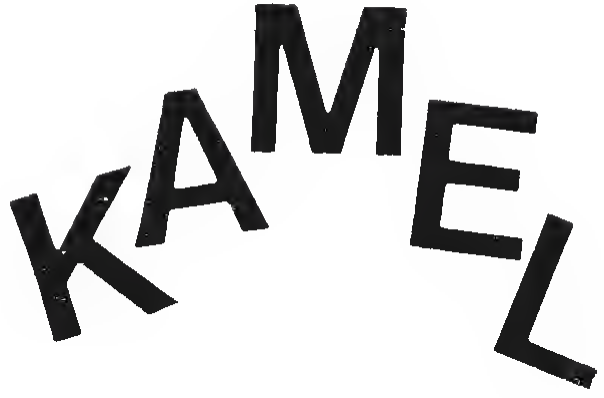
SHORT PROGRAM

```
   POKE 24576,38: POKE 26112,0
4  REM  COPYRIGHT 1979 CREATIVE COMPUTING; MOD 1r       rUR    APF BY G.R. J ON  ES 1981
30  CALL 17046: PRINT  TAB (14)"KAMEL"
35  PRINT
40  PRINT "WELCOME TO KAMEL.  THE OBJECT IS"
70  PRINT "TO TRAVEL 200 MILES ACROSS THE"
75  PRINT "GREAT GOBI DESERT.  A TRIBE OF"
80  PRINT "KNOCK-KNEED PYGMIES WILL BE "
85  PRINT "CHASING YOU.  YOU WILL BE ASKED"
90  PRINT "FOR COMMANDS EVERY 50 OFTEN.": PRINT
110  PRINT "YOU HAVE ONE QUART OF WATER"
112  PRINT "WHICH WILL LAST YOU SIX DRINKS."
120  PRINT "YOU MAY RENEw YOUR WATER SUPPLY"
125  PRINT "COMPLETELY AT AN OASIS.  YOU"
130  PRINT "GET 1/2 QUART IF FOUND BY HELP.";
160  PRINT : PRINT "PRESS ANY KEY TO CONTINUE.";
170 X= RND (0): IF  KEY$ (0)="" THEN 170
175  CALL 17046
176  PRINT "           COMMANDS": PRINT
180  PRINT "#1 DRINK FROM CANTEEN'
190  PRINT "#2 AHEAD MODERATE SPEED"
200  PRINT "#3 AHEAD FULL SPEED"
205  PRINT "#4 STOP FOR THE NIGHT'
210  PRINT "#5 STATUS CHECK'
215  PRINT "#6 HOPE FOR HELP (OUT OF WATER)"
218  PRINT : PRINT : PRINT : PRINT "PRESS ANY KEY TO CONTINUE.": PRINT : PRINT
219  IF  KEY$ (0)="" THEN 219
220  CALL 17046: PRINT "YOU ARE IN THE MIDDLE OF THE'
221  PRINT "DESERT AT AN OASIS.": PRINT
250  GOSUB 1550
240  IF C>199 THEN  GOTO 1090
250 Z=Z-1
260  IF Z=0 THEN  PRINT "*************WARNING*************        TAKE A DRINK !": PRINT : PRINT
270  IF Z<0 THEN  PRINT 'YOUR BOD JUST DEHYDRATED.': GOTO 1290
280 P=P+1
290 X2= INT ( RND (0)*10+2.5)
300  IF Q>0 THEN 800
310  IF P<4 THEN 380
320 C1=C1+X2
330  IF C1<C THEN  GOTO 370
340  PRINT "THE PYGMIES HAVE CAPTURED YOU."
341  PRINT "KAMEL AND PEOPLE SOUP IS THEIR'
350  PRINT "FAVORITE DISH!"
360  GOTO 1440
370  PRINT "THE PYGMIES ARE "C1-C1" MILES BEHIND"
371  PRINT "YOU."
380  PRINT "YOU HAVE TRAVELLED "C1" MILES.": PRINT
390  PRINT : PRINT '   1    2    3    4    5    6"
393  PRINT " DRINK MOD FAST STOP STAT HELP!": PRINT
395  INPUT "WHAT IS YOUR COMMAND";Y
400  PRINT
420  ON Y GOTO 690,490,560,620,660,430
```

This program, submitted by GLENN JONES has appeared in a past newsletter, but we thought those of you who weren't members at that time might enjoy the game.

THANKS GLENN

```
430 T= INT ( RND (0)*10)
440  IF T>2 THEN  GOTO 1000
450  PRINT "HELP HAS FOUND YOU IN A STATE"
451  PRINT "OF UNCONSCIOUSNESS."
460 S=3
470 Z=4
480  GOTO 240
490 F=F+1
500  IF F=8 THEN  GOTO 1070
510  GOSUB 740
520 X1= INT ( RND (0)*10)
530 C=C+X1
540  PRINT "YOUR KAMEL LIKES THIS PACE."
543  FOR G=0 TO 6
545  FOR H=0 TO 100: NEXT H
547  PRINT
549  NEXT G
550  GOTO 240
560 F=F+3
570  IF F>7 THEN  GOTO 1070
580  GOSUB 740
590 X1=2* INT ( RND (0)*10)
600 C=C+X1
610  PRINT "YOUR KAMEL IS BURNING ACROSS"
611  PRINT "THE DESERT SANDS."
613  FOR G=0 TO 150: NEXT G
615  FOR G=0 TO 10
617  FOR H=0 TO 50: NEXT H: PRINT
619  NEXT G
620  GOTO 240
630  CALL 17046: PRINT "    YOUR KAMEL THANKS YOU.": PRINT : PRINT : PRINT : PRINT : PRINT
632  FOR G=0 TO 800: NEXT G
640 F=0
650  GOTO 250
660  PRINT "YOUR KAMEL HAS ";7-F;" GOOD DAYS LEFT.";
670  PRINT "YOU HAVE ";S;" DRINKS LEFT IN YOUR"
671  PRINT "CANTEEN."
680  PRINT "YOU CAN GO ";Z;" COMMANDS WITHOUT"
681  PRINT "TAKING A DRINK."
685  GOTO 390
690 S=S-1
700  IF S<0 THEN  GOTO 1490
710  IF S<2 THEN  PRINT "BETTER WATCH FOR AN OASIS!": PRINT
715  IF S>1 THEN  PRINT : PRINT "          AAAHHHH !": PRINT
720 Z=4
730  GOTO 390
740 A= INT (100* RND (0))
750  IF A>5 THEN  GOTO 1000
760  PRINT "WILD BERBERS HIDDEN IN THE SAND"
761  PRINT "HAVE CAPTURED YOU."
770  PRINT "LUCKILY THE LOCAL SHEIK HAS"
771  PRINT "AGREED TO PAY THEIR RANSOM"
780  PRINT "DEMANDS BUT....WATCH OUT FOR THE";
781  PRINT "PYGMIES!"
790  PRINT : PRINT "YOU HAVE SOME NEW OPTIONS:"
800  PRINT "#7 ATTEMPT AN ESCAPE"
810  PRINT "#8 WAIT FOR PAYMENT": PRINT
820  INPUT "WHICH COMMAND";X
840  IF X=8 THEN 920
```

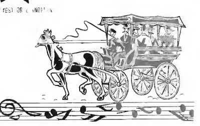


KAMEL

```
85Ø X1= INT ( RNO (Ø)*1Ø)
86Ø  IF X1<5 THEN  GOTO 9ØØ
87Ø  PRINT "CONGRATULATIONS!  YOU HAVE"
871  PRINT "SUCCESSFULLY ESCAPED!"
873  FOR G=Ø TO 35Ø: NEXT
875  FOR G=Ø TO 6: PRINT
877  FOR H=Ø TO 25: NEXT H
879  NEXT G
88Ø Q=Ø
89Ø  GOTO 24Ø
9ØØ  PRINT : PRINT "YOU WERE MORTALLY WOUNDED 8Y A"
9Ø1  PRINT "PIC STA88ER WHILE ESCAPING.": PRINT
91Ø  GOTO 129Ø
92Ø X1= INT (1ØØ* RNO (Ø))
94Ø  IF X1>24 THEN  GOTO 98Ø
95Ø  PRINT : PRINT "YOUR RANSOM HAS 8EEN PAID ANO"
951  PRINT "YOU ARE FREE TO GO.": PRINT
96Ø Q=Ø
97Ø  GOTO 24Ø
98Ø  PRINT : PRINT "THE LOCAL SULTAN IS COLLECTING;"
981  FOR G=Ø TO 15Ø: NEXT G
983  PRINT "...........JUST WAIT..........."
984  FOR G=Ø TO 125: NEXT G
985  FOR E=1 TO 1Ø: PRINT : FOR V=1 TO 1ØØ: NEXT V: NEXT E
99Ø  GOTO 24Ø
1ØØØ A= INT (23* RND (Ø))
1Ø1Ø  IF A<22 THEN 112Ø
1Ø2Ø  PRINT "YOU HAVE ARRIVED AT AN OASIS---"
1Ø21  PRINT "YOUR KAMEL IS FILLING YOUR"
1Ø3Ø  PRINT "CANTEEN AND EATING FIGS.": PRINT
1Ø35  FOR G=Ø TO 1ØØØ: NEXT
1Ø4Ø Z=4
1Ø5Ø S=6
1Ø6Ø  RETURN
1Ø7Ø  PRINT "YOU OIRTY RAPSCALLION! YOU RAN"
1Ø71  PRINT "YOUR POOR KAMEL TO OEATH!"
188Ø  GOTO 129Ø
189Ø  PRINT "YOU WIN!!!  THE PYGMIES ARE"
1Ø91  PRINT "THROWING A DANQUET ANO WOULD"
11ØØ  PRINT "LIKE TO SERVE YOU AS GUEST OF"
11Ø1  PRINT "HONOR."
111Ø  GOTO 144Ø
112Ø X1= INT (1ØØ* RND (8))
113Ø  IF X1>5 THEN  GOTO 123Ø
114Ø  PRINT "YOU HAVE BEEN CAUGHT IN A SAND-"
1141  PRINT "STORM....LOTS OF LUCK!": FOR L=Ø TO 5ØØ: NEXT L
1142  FOR G=Ø TO 5Ø
1143 V= INT ( RND (8)*2Ø)
1144  PRINT  TA8 (V);".     .     .   .   .         . .    .     .   .     ."
1145  NEXT G
115Ø X5= INT (1Ø* RNO (Ø))
116Ø X6= INT (1Ø* RND (Ø))
117Ø  IF X6<5 THEN  GOTO 12ØØ
118Ø C=C+X5
119Ø  GOTO 121Ø
12ØØ C=C-X5
121Ø  PRINT "YOUR NEW POSITION IS ";C;" MILES"
1211  PRINT "SO FAR"
```

SHORT PROGRAM

```
1220 RETURN
1230 X1= INT (100* RND (0))
1240 IF X1>5 THEN RETURN
1250 C1=C1+1
1260 PRINT "YOUR KAMEL HURT HIS HUMP."
1270 PRINT "LUCKILY, THE PYGMIES ARE WEARY.": PRINT
1272 FOR G=0 TO 4
1274 FOR H=0 TO 150: NEXT
1276 PRINT
1278 NEXT
1280 RETURN
1290 U= INT (10* RND (0))
1300 PRINT "YOU DIED IN THE DESERT.": PRINT
1310 IF U>1 THEN GOTO 1340
1320 PRINT "THE NATIONAL KAMEL'S UNION IS"
1321 PRINT "NOT ATTENDING YOUR FUNERAL."
1330 GOTO 1440
1340 IF U>3 THEN GOTO 1370
1350 PRINT "YOUR BODY WAS EATEN BY VULTURES."
1360 GOTO 1440
1370 IF U>5 THEN GOTO 1400
1380 PRINT "THE LOCAL SHEIK NOW USES YOUR"
1381 PRINT "SKULL FOR A CHANGE PURSE "
1390 GOTO 1440
1400 IF U>7 THEN GOTO 1430
1410 PRINT "PEOPLE OF LITTLE INTELLIGENCE"
1411 PRINT "SHOULD STAY OUT OF THE GOBI!"
1420 GOTO 1440
1430 PRINT "TURKEYS SHOULD FLY, NOT RIDE"
1431 PRINT "KAMELS "
1440 PRINT : INPUT "WANT A NEW KAMEL AND A NEW GAME ENTER 1 (YES) OR 2 (NO)"; N
1450 IF N=1 GOTO 50
1480 GOTO 1510
1490 PRINT "SORRY,CHUMP --YOU RAN OUT OF"
1491 PRINT "WATER!": PRINT
1500 GOTO 1290
1510 PRINT : PRINT "              CHICKEN "
1520 END
1550 Z=4
1560 S=6
1570 C=0
1580 C1=0
1590 Q=0
1600 F=0
1610 P=0
1620 RETURN
```

```
10 FOR I=1 TO 2
20 MUSIC "*1300 50 30 20 100000 21 3000 50 +300 7000 +10 + 3000 20 50 +40, 6000 +0700000"
30 MUSIC "     "
40 MUSIC "7000 60 50 70 6000 56 66 69 60 600000"
60 MUSIC "     "
70 MUSIC "*2000 70 60 *20 7300 +0 50 50 50 500000"
80 MUSIC "     "
90 MUSIC "*1000 50 30 20 100000 30 3000 50 +1 60 900 +16 *20000 20 50 +400 1000 *2000000"
100 MUSIC "     "
990 MUSIC "*2000 *10 70 *20 *1000 60 7000 70 70000 6000 56 5000 0 *10 *,000 5000 +10,00000000000000"
995 MUSIC "     "
996 NEXT I
999 END
```

An OLDE TIME melody from
HAL BLOOM

ORCHESTRA PIT

THE ARCADE

While we're waiting for more information from Eric, let's review the 6 addressing modes of the 6800. This may be easier than trying to look back for the one you want to use. Here they all are in ONE issue.

The MC6800 Microprocessor has 6 addressing modes available to the programmer. They are INHERENT/ACCUMULATOR, IMMEDIATE, DIRECT, EXTENDED, INDEXED, and RELATIVE.

A. INHERENT/ACCUMULATOR

These addressing modes have one-byte instructions and therefore either do not require addressing a memory location or the addressing information is contained in the instruction. An example of an INHERENT instruction would be to execute a "clear carry bit" instruction and would look like this in memory:

MEMORY LOCATION	MEMORY CONTENTS (hex)
0100	0C (CLC op-code)

0C in hex is the CLC instruction. The result of this instruction would be to load a zero in the carry bit in the MPU condition code register.

An example of an ACCUMULATOR instruction would be to execute an "arithmetic shift left of accumulator A" instruction and would look like this in memory:

MEMORY LOCATION	MEMORY CONTENTS (hex)
0100	48 (ASL A op-code)

48 in hex is the ASL A instruction. The result of this instruction will have the contents of accumulator A shifted one place to the left. Bit 0 (LSB) of the accumulator will be loaded with a zero and bit 7 (MSB) will be loaded into the carry bit of the condition code register.

An example of an inherent memory addressing instruction would be to execute a "PUSH DATA" instruction and would look like this in memory:

MEMORY LOCATION	MEMORY CONTENTS (hex)
0100	36 (PSH A op-code)

36 in hex is the PSH A instruction. Execution of this instruction will cause the contents of accumulator A to be loaded into memory at the address contained in the stack pointer register. The stack pointer register is then decremented by one.

Source input coding to an assembler, written in mnemonics, for the above three instructions would appear as follows:

```
CLC
ASL A
PSH A
```

B. IMMEDIATE

In this mode of addressing, the operand is found the the next one or two memory locations following the op code.

C. DIRECT

In this mode of addressing, the address is found in the next memory location following the op code. This enables direct addressing of the first 256 bytes of memory (0000 to 00FF in hex).

D. EXTENDED

This mode of addressing is used to address memory locations ABOVE 00FF. The second memory location of the instruction contains the high order 8 bits of the address, and the 3rd memory location contains the low order 8 bits of the address.

E. INDEXED

In this mode of addressing, the number (offset) found in the second memory location of the instruction is ADDED TO THE CONTENTS of the index register to form a new effective address. The new effective address is the location in memory which contains the data for the operation or is the destination for data.

The effective address is held in a temporary address register so the content of the index register is not destroyed or altered.

F. RELATIVE

In this mode of addressing, program control may be transferred to someplace other than the next sequential memory location. It is used for BRANCH instructions ONLY. Transfer is limited to 126 memory locations BACK, or 129 memory locations FORWARD from the present location. Since this is a 2 byte instruction, transfer is always referenced from the next instruction which the MPU would execute if it did not transfer control. This reference point would be the present value of the program counter after reading the 2 byte instruction, or the present location +2. The number of memory locations to branch over is called the OFFSET and is expressed as an 8 bit 2's complement number.

TABLE 6 – HEXADECIMAL VALUES OF MACHINE CODES

00	*			40	NEG	A		80	SUB	A	IMM	C0	SUB	B	IMM
01	NOP			41	*			81	CMP	A	IMM	C1	CMP	B	IMM
02	*			42	*			82	SBC	A	IMM	C2	SBC	B	IMM
03	*			43	COM	A		83	*			C3	*		
04	*			44	LSR	A		84	AND	A	IMM	C4	AND	B	IMM
05	*			45	*			85	BIT	A	IMM	C5	BIT	B	IMM
06	TAP			46	ROR	A		86	LDA	A	IMM	C6	LDA	B	IMM
07	TPA			47	ASR	A		87	*			C7	*		
08	INX			48	ASL	A		88	EOR	A	IMM	C8	EOR	B	IMM
09	DEX			49	ROL	A		89	ADC	A	IMM	C9	ADC	B	IMM
0A	CLV			4A	DEC	A		8A	ORA	A	IMM	CA	ORA	B	IMM
0B	SEV			4B	*			8B	ADD	A	IMM	CB	ADD	B	IMM
0C	CLC			4C	INC	A		8C	CPX	A	IMM	CC	*		
0D	SEC			4D	TST	A		8D	BSR		REL	CD	*		
0E	CLI			4E	*			8E	LDS		IMM	CE	LDX		IMM
0F	SEI			4F	CLR	A		8F	*			CF	*		
10	SBA			50	NEG	B		90	SUB	A	DIR	D0	SUB	B	DIR
11	CBA			51	*			91	CMP	A	DIR	D1	CMP	B	DIR
12	*			52	*			92	SBC	A	DIR	D2	SBC	B	DIR
13	*			53	COM	B		93	*			D3	*		
14	*			54	LSR	B		94	AND	A	DIR	D4	AND	B	DIR
15	*			55	*			95	BIT	A	DIR	D5	BIT	B	DIR
16	TAB			56	ROR	B		96	LDA	A	DIR	D6	LDA	B	DIR
17	TBA			57	ASR	B		97	STA	A	DIR	D7	STA	B	DIR
18	*			58	ASL	B		98	EOR	A	DIR	D8	EOR	B	DIR
19	DAA			59	ROL	B		99	ADC	A	DIR	D9	ADC	B	DIR
1A	*			5A	DEC	B		9A	ORA	A	DIR	DA	ORA	B	DIR
1B	ABA			5B	*			9B	ADD	A	DIR	DB	ADD	B	DIR
1C	*			5C	INC	B		9C	CPX		DIR	DC	*		
1D	*			5D	TST	B		9D	*			DD	*		
1E	*			5E	*			9E	LDS		DIR	DE	LDX		DIR
1F	*			5F	CLR	B		9F	STS		DIR	DF	STX		DIR
20	BRA		REL	60	NEG		IND	A0	SUB	A	IND	E0	SUB	B	IND
21	*			61	*			A1	CMP	A	IND	E1	CMP	B	IND
22	BHI		REL	62	*			A2	SBC	A	IND	E2	SBC	B	IND
23	BLS		REL	63	COM		IND	A3	*			E3	*		
24	BCC		REL	64	LSR		IND	A4	AND	A	IND	E4	AND	B	IND
25	BCS		REL	65	*			A5	BIT	A	IND	E5	BIT	B	IND
26	BNE		REL	66	ROR		IND	A6	LDA	A	IND	E6	LDA	B	IND
27	BEQ		REL	67	ASR		IND	A7	STA	A	IND	E7	STA	B	IND
28	BVC		REL	68	ASL		IND	A8	EOR	A	IND	E8	EOR	B	IND
29	BVS		REL	69	ROL		IND	A9	ADC	A	IND	E9	ADC	B	IND
2A	BPL		REL	6A	DEC		IND	AA	ORA	A	IND	EA	ORA	B	IND
2B	BMI		REL	6B	*			AB	ADD	A	IND	EB	ADD	B	IND
2C	BGE		REL	6C	INC		IND	AC	CPX		IND	EC	*		
2D	BLT		REL	6D	TST		IND	AD	JSR		IND	ED	*		
2E	BGT		REL	6E	JMP		IND	AE	LDS		IND	EE	LDX		IND
2F	BLE		REL	6F	CLR		IND	AF	STS		IND	EF	STX		IND
30	TSX			70	NEG		EXT	B0	SUB	A	EXT	F0	SUB	B	EXT
31	INS			71	*			B1	CMP	A	EXT	F1	CMP	B	EXT
32	PUL	A		72	*			B2	SBC	A	EXT	F2	SBC	B	EXT
33	PUL	B		73	COM		EXT	B3	*			F3	*		
34	DES			74	LSR		EXT	B4	AND	A	EXT	F4	AND	B	EXT
35	TXS			75	*			B5	BIT	A	EXT	F5	BIT	B	EXT
36	PSH	A		76	ROR		EXT	B6	LDA	A	EXT	F6	LDA	B	EXT
37	PSH	B		77	ASR		EXT	B7	STA	A	EXT	F7	STA	B	EXT
38	*			78	ASL		EXT	B8	EOR	A	EXT	F8	ADC	B	EXT
39	RTS			79	ROL		EXT	B9	ADC	A	EXT	F9	ADC	B	EXT
3A	*			7A	DEC		EXT	BA	ORA	A	EXT	FA	ORA	B	EXT
3B	RTI			7B	*			BB	ADD	A	EXT	FB	ADD	B	EXT
3C	*			7C	INC		EXT	BC	CPX		EXT	FC	*		
3D	*			7D	TST		EXT	BD	JSR		EXT	FD	*		
3E	WAI			7E	JMP		EXT	BE	LDS		EXT	FE	LDX		EXT
3F	SWI			7F	CLR		EXT	BF	STS		EXT	FF	STX		EXT

Notes 1. Addressing Modes

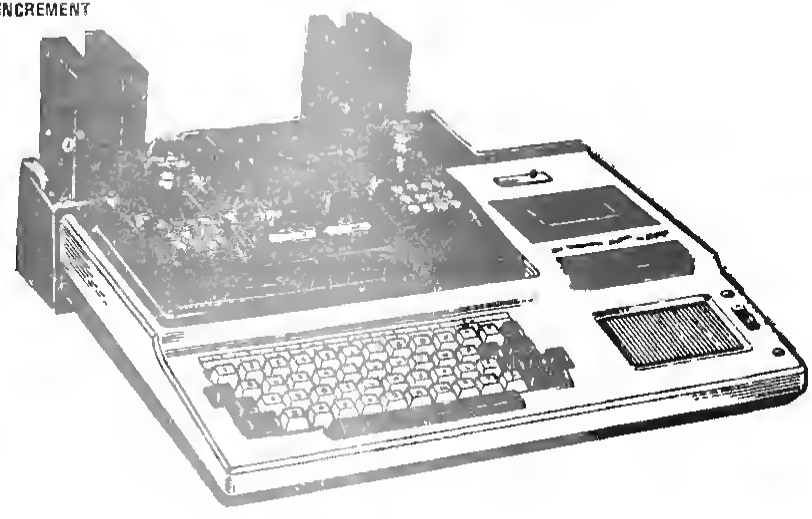
A	= Accumulator A	IMM	= Immediate
B	= Accumulator B	DIR	= Direct
REL	= Relative		
IND	= Indexed		

2 Unassigned code indicated by

THE ARCADE

EXECUTABLE INSTRUCTIONS — ALPHABETIC LIST

ABA	ADD ACCUMULATORS
ADC	ADD WITH CARRY
ADD	ADD
AND	LOGICAL AND
ASL	ARITHMETIC SHIFT LEFT
ASR	ARITHMETIC SHIFT RIGHT
BCC	BRANCH IF CARRY CLEAR
BCS	BRANCH IF CARRY SET
BEQ	BRANCH IF EQUAL TO ZERO
BGE	BRANCH IF GREATER OR EQUAL ZERO
BGT	BRANCH IF GREATER THAN ZERO
BHI	BRANCH IF HIGHER
BIT	BIT TEST
BLE	BRANCH IF LESS OR EQUAL
BLS	BRANCH IF LOWER OR SAME
BLT	BRANCH IF LESS THAN ZERO
BMI	BRANCH IF MINUS
BNE	BRANCH IF NOT EQUAL TO ZERO
BPL	BRANCH IF PLUS
BRA	BRANCH ALWAYS
BSR	BRANCH TO SUBROUTINE
BVC	BRANCH IF OVERFLOW CLEAR
BVS	BRANCH IF OVERFLOW SET
CBA	COMPARE ACCUMULATORS
CLC	CLEAR CARRY
CLI	CLEAR INTERRUPT MASK
CLR	CLEAR
CLV	CLEAR OVERFLOW
CMP	COMPARE
COM	COMPLEMENT
CPX	COMPARE INDEX REGISTER
DAA	DECIMAL ADJUST
DEC	DECREMENT
DES	DECREMENT STACK POINTER
DEX	DECREMENT INDEX REGISTER
EOR	EXCLUSIVE OR
INC	INCREMENT
INS	INCREMENT STACK POINTER
INX	INCREMENT INDEX REGISTER
JMP	JUMP
JSR	JUMP TO SUBROUTINE
LDA	LOAD ACCUMULATOR
LDS	LOAD STACK POINTER
LDX	LOAD INDEX REGISTER
LSR	LOGICAL SHIFT RIGHT
NEG	NEGATE
NOP	NO OPERATION
ORA	INCLUSIVE OR ACCUMULATOR
PSH	PUSH DATA
PUL	PULL DATA
ROL	ROTATE LEFT
ROR	ROTATE RIGHT
RTI	RETURN FROM INTERRUPT
RTS	RETURN FROM SUBROUTINE
SBA	SUBTRACT ACCUMULATORS
SBC	SUBTRACT WITH CARRY
SEC	SET CARRY
SEI	SET INTERRUPT MASK
SEV	SET OVERFLOW
STA	STORE ACCUMULATOR
STS	STORE STACK REGISTER
STX	STORE INDEX REGISTER
SUB	SUBTRACT
SWI	SOFTWARE INTERRUPT
TAB	TRANSFER ACCUMULATORS
TAP	TRANSFER ACCUMULATORS TO CONDITION CODE REG
TBA	TRANSFER ACCUMULATORS
TPA	TRANSFER CONDITION CODE REG TO ACCUMULATOR
TST	TEST
TSX	TRANSFER STACK POINTER TO INDEX REGISTER
TXS	TRANSFER INDEX REGISTER TO STACK POINTER
WAI	WAIT FOR INTERRUPT



WHAT'S IN IT... FOR YOU

Return before Nov 30, 1984
SURVEY AND ENROLLMENT FORM
JAN 1 to DEC 31 1985

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

With rising expenses we will be unable to publish a MONTHLY newsletter in 1985. We have decided to publish a large QUARTERLY instead. The membership dues for the year are set at $12.00 with the first quarterly issue delivered in MARCH and the final (4th) delivered in DECEMBER 1985. Club members benefits include: Access to free programs in the club library (shipping/handling costs = 3 programs for $5.00), programming and technical assistance, free product reviews and evaluation, and 4 newsletters as mentioned above.
Any special request will be handled on an individual basis and every attempt will be made to satisfy member requests.
If the new 1985 membership enrollment is not consistent with 1984 levels, all membership dues paid for 1985 will be returned.
Please answer the following questions:

1. I HAVE ___IM-1(s) ___PRINTER ___DISK DRIVE(s) ___MODEM ___8K ___16K ___LARGER ___OTHER EQUIP.
2. I WOULD LIKE TO ADD THE FOLLOWING _____
3. THEREFORE I NEED THE FOLLOWING _____
4. SUBJECTS IN THE NEWSLETTER I WOULD LIKE TO SEE _____
5. I OWN OTHER COMPUTERS ___YES ___NO _____ TYPE
6. IN COMPARISON TO OTHER SYSTEMS I FIND THE IM-1 TO BE _____
7. I WRITE MY OWN PROGRAMS ONLY ___YES ___NO
8. I PURCHASE PROGRAMS FROM ADVERTISERS IN THE NEWSLETTER ___OCCASIONALLY ___NEVER
9. ARTICLES I LIKE IN THE NEWSLETTER (please be specific. Attach page if needed) _____
10. ARTICLES I WOULD LIKE REMOVED FROM THE NEWSLETTER (please be specific. Attach page if needed) _____
11. I RATE MY KNOWLEDGE IN PROGRAMMING THE IM-1 ___HIGH ___MEDIUM ___LOW
12. I RATE MY UNDERSTANDING OF IM-1 CIRCUITRY ___HIGH ___MEDIUM ___LOW
13. I HAVE MADE THE FOLLOWING MODIFICATIONS TO MY IM-1 _____
14. I WOULD BE WILLING TO HELP OTHERS IF REQUESTED WITH ___PROGRAMMING ___MAINTENANCE
Comments on 14. _____
15. I HAVE, OR KNOW OF, AVAILABLE INTERFACE CARTRIDGES FOR THE IM-1 THAT COULD BE PURCHASED BY INTERESTED MEMBERS ___YES ___NO. IF YES PLEASE LIST THEM _____
16. AGE GROUPS THAT USE THE IM-1 IN MY HOME ARE _____
17. I FEEL THE NEWSLETTER IS ___DIFFICULT TO UNDERSTAND ___EASY TO UNDERSTAND
18. I READ ALL OF THE NEWSLETTER ___YES ___NO
19. I USE MY IM-1 ___FREQUENTLY ___INFREQUENTLY
20. I USE MY IM-1 FOR _____
21. I WOULD LIKE TO SELL MY COMPUTER ___YES ___NO. IF YES LIST ALL COMPONENTS _____
22. IF AN ARTICLE CALLED 'IM-1 PHOTO-MAINTENANCE APPEARED IN THE 1985 NEWSLETTER, I WOULD, OR COULD BE EQUIPPED TO PERFORM MAINTENANCE ON MY OWN COMPUTER IF ADEQUATE INSTRUCTION WAS PROVIDED ___YES ___NO ___MAYBE
23. ADDITIONAL COMMENTS _____